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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
CHUNG, DANIEL J	

ART UNIT	PAPER NUMBER
2672	20

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/244,270	YUE ET AL.	
	Examiner	Art Unit	
	Daniel J Chung	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 14-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,14-22 and 24-40* is/are rejected.

7)☒ Claim(s) *23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claims 1-2 and 14-40 are presented for examination. This office action is in response to the Response filed on 8-07-2003.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2,14-22 and 24-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanaswami et al (6,052,128) in view of Lentz et al (5,446,836), and further in view of Sfarti (5,528,737).

Regarding claim 1, Narayanaswami et al discloses that the claimed feature of a method comprising: receiving vertex data ["image coordinate information"] corresponding to the vertices of a primitive [31-34], the vertex data including x-coordinate and y-coordinate position information; sorting the vertex data in coordinate dependent fashion; generating region bits ["outcode", "clip code"] representing the location of the sorted vertex data with respect to a current tile [30] being rendered; generating [clipping test; 26] coordinate data representing an initial rasterization starting point estimate when the region bits indicate that at least one of the sorted vertex data

lies within the current tile [30] being rendered and discarding the sorted vertex data of primitives [i.e. 31] that lie outside the boundary of the current tile being rendered; and providing [Rasterization; 27] the initial rasterization starting point estimate to a rasterizer. (See Abstract, Fig 1, Fig 2, Fig 3, Fig 4, Fig 6, col 1 line 52-col 2 line 23, col 2 line 42-52)

Narayanaswami et al does not specifically disclose that "generating coordinate data representing an initial rasterization starting point estimate. However, such step [generating coordinate data for rasterization starting point] is necessarily required for displaying clipped image by rasterizer [13]. In other word, starting/ending points have to be given or generated, in order to raster any type of polygon/primitives. Therefore, the operation in rasterizer [13] of Narayanaswami inherently meets the limitation in recited claim, as broadly claimed by applicant. [i.e. the method/function of generating rasterization starting point coordinates are not presented] Furthermore, as to the teaching of Lentz et al, it would have been obvious to one skilled in the art to generate the starting raster points during the polygon rasterization. (See Fig 4A, Fig 4B, Fig 5, Fig 6, Fig 9, col 3 line 36-col 4 line 46) The motivation would have been to decrease a substantial time of the rasterization efficiently and to minimize computation time for rasterization (by eliminating the image process on invisible side), as such improvement [finding starting point for rasterization] is also advantageously desirable in the teaching of Narayanaswami et al for rendering the image with faster time.

Narayanaswami et al does not explicitly disclose the step of sorting the vertex data. However, Sfarti teaches such claimed feature of invention [130, 160]. (See Abstract, Fig 4, Fig 5, col 3 line 46-63, col 7 line 11-13) It would have been obvious to one skilled in the art to incorporate the teaching of Sfarti into the teaching of Narayanaswami et al, in order to "minimize computation by easily determining the edges bound" (See col 3 line 54-55 in Sfarti), as such improvement [sorting step] is also advantageously desirable in the teaching of Narayanaswami et al for performing clipping processing with efficient manner.

Regarding claim 2, Narayanaswami et al fails to disclose that generating an orientation bit representing an orientation of a line connecting the first and second vertices of the sorted primitive with respect to a line connecting the first and third vertices of the sorted primitive before generating the initial rasterization starting point coordinates. However, using orientation of triangles to classify or organize the triangle variable or/and calculating an orientation of two side of a triangle is necessarily required for classifying the triangle base on its shape [i.e. right oriented triangle, left oriented triangle] in order to render/raster the triangle/primitives effectively with easy manner (See Schroeder (U.S 4,930,091), which previously provided 'Notice of References Cited' in paper No. 4) Therefore, it would have been obvious to one skilled in the art to have orientation bit into the teaching of Narayanaswami et al for performing faster rasterization process.

Regarding claim 14, claim 14 is similar in scope to the claim 1, and thus the rejection to claim 1 hereinabove is also applicable to claim 14.

Regarding claim 15, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that the initial rasterization starting point estimation circuit includes a trivial accept circuit operative to provide the initial rasterization starting point in response to the region bits. (See Fig 6, col 2 line 42-52)

Regarding claim 16, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that the vertex data is sorted in y-coordinate fashion and the trivial accept circuit provides the x-coordinate and sorted y-coordinate rasterization starting point of a non-discarded primitive. (See Fig 6, col 2 line 42-52)

Regarding claim 17, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that an interception calculation circuit operative to provide a coordinate dependent initial rasterization starting point in response to the region bits and the vertex data. (See Fig 3, Fig 4, Fig 6, col 2 line 42-52; also See Fig 3A-3C, Fig 7A-Fig 12D in Chang)

Regarding claim 18, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that the boundary interception point generated by the intercept calculation circuit represents the initial rasterization point starting point coordinate. (See Fig 3, Fig 4, Fig 6, col 2 line 42-52; also See Fig 3A-3C, Fig 7A-Fig 12D in Chang)

Regarding claim 19, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that an interception calculation circuit operative to provide a coordinate dependent initial rasterization starting point in response to the region bits and the sorted vertex data. (See Fig 3, Fig 4, Fig 6, col 2 line 42-52; also See Fig 3A-3C, Fig 7A-Fig 12D in Chang)

Regarding claim 20, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that the trivial accept circuit comprises a logic gate coupled to a corresponding subset of the region bits. (See Fig 6, col 2 line 13-23)

Regarding claim 21, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that the logic gate is an AND gate. (See Fig 6, col 2 line 13-23)

Regarding claim 22, Narayanaswami et al discloses that the region bits define the top edge, bottom edge, right edge and left edge of a current tile being rendered. (See Fig 3, Fig 4)

Regarding claim 24, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that the x-coordinate and y-coordinate of the initial rasterization starting point to the boundary intercept points. (See Fig 3, Fig 4, Fig 6, col 2 line 42-52, Also See comparison between Fig 4A and Fig 4B in Lentz)

Regarding claim 25, Narayanaswami et al fails to discloses that generating an orientation bit representing an orientation of a line connecting the sorted first and second vertices with respect to a line connecting the sorted first and third vertices. However, using orientation of triangles to classify or organize the triangle variable or/and calculating an orientation of two side of a triangle is necessarily required for classifying the triangle base on its shape [i.e. right oriented triangle, left oriented triangle] in order to render/raster the triangle/primitives effectively with easy manner (See col 1 line 58-67 in Sfarti; Also See Schroeder (U.S 4,930,091), which previously provided 'Notice of References Cited' in paper No. 4) Therefore, it would have been obvious to one skilled in the art to have orientation bit into the teaching of Narayanaswami et al for performing faster rasterization process.

Regarding claim 26, refer to the discussion for the claim 1 hereinabove, Narayanaswami et al discloses that determining the relative positioning between the vertices of the primitive. (See Fig 3)

Regarding claims 27-28, claims 27-28 are similar in scope to the claim 1, and thus the rejection to claim 1 hereinabove is also applicable to claims 27-28.

Regarding claims 29-34, Narayanaswami et al fails to teach that the sorting step comprises arranging the position data in descending/ascending y or x-coordinate order. However, Sfarti teaches such claimed feature of invention [130, 160]. (See Abstract, Fig 4, Fig 5, col 3 line 46-63, col 7 line 11-13) It would have been obvious to one skilled in the art to incorporate the teaching of Sfarti into the teaching of Narayanaswami et al, in order to "minimize computation by easily determining the edges bound" (See col 3 line 54-55 in Sfarti), as such improvement [sorting step] is also advantageously desirable in the teaching of Narayanaswami et al for performing clipping processing with efficient manner.

Regarding claims 35-40, Narayanaswami et al discloses such claimed clipping process. (See Fig 3, Fig 4, Fig 6, col 1 line 57-col 2 line 23, col 2 line 42-5) Although, the clipping process of Narayanaswami et al do not have a comparison between the coordinate values of the primitive with the coordinate values of the current tile, Examiner

takes official notice that such clipping process is well known in the art, in order to perform non-complicated and optimized clipping process.

Allowable Subject Matter

Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Amendment/Argument

Applicant's arguments with respect to claims 1-2 and 14-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Chung whose telephone number is (703) 306-3419. He can normally be reached Monday-Thursday and alternate Fridays from 7:30am- 5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael, Razavi, can be reached at (703) 305-4713.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

djc
October 16, 2003

JEFFERY BRIER
PRIMARY EXAMINER